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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/033,732	12/27/2001	Liang-Yuh Chen	AMAT/4100.P1/CMP/CMP/RKK	7456

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APPLIED MATERIALS, INC.  
2881 SCOTT BLVD. M/S 2061  
SANTA CLARA, CA 95050

EXAMINER

THOMAS, DAVID B

ART UNIT PAPER NUMBER

3723

DATE MAILED: 12/12/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/033,732

Applicant(s)

CHEN ET AL.

Examiner

David B. Thomas

Art Unit

3723

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 04 November 2002.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 29-40 is/are allowed.
- 6) ☒ Claim(s) 1,2,4,5,8,9,13-15,22 and 28 is/are rejected.
- 7) ☒ Claim(s) 3,6,7,10-12,16-21,23-27 and 41 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)                      4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)                      5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2,3,9.                      6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

2. Claims 1, 2, 5, 8, and 9 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Kaanta et al. (4,793,895).
3. Claims 1, 5, 8, 9, 13, 14, 15, 22, and 28 are rejected under 35 U.S.C. 102(e) as being anticipated by Paton (6,297,159).

Paton ('159) discloses an embodiment of the invention which provides electrical contact with the front side of the wafer having the metal layer 22 thereon. Wafer 20 is held against spindle 40 by vacuum suction, and is brought into contact with, and moved relative to (generally rotated against), polishing pad 50 having ER fluid 52 thereon. Polishing pad 50 is made of an insulating material; atop metal electrode 54 which is positioned on insulating platen 41. Electrical contact 58 is made to electrode 54. Soft conducting contacts 60 are embedded in an array across polishing pad 50, and protrude from its surface. Contacts 60 are aligned against metal pins 62 which are directed through platen

41 and through insulating sheaths 64 embedded in metal electrodes 54. Voltage  $V$  is applied between electrode 54 and contacts 60. As wafer 20 is brought into close proximity to polishing pad 50, physical contact is made between some or all of contacts 60 and metal layer 22 atop wafer 20. Voltage  $V$  is thereby established between metal layer 22 and electrode 54, across ER fluid 52. Electric field lines 65 show that the electric field is higher at some raised metal regions 28 than at lower metal regions 34, thereby providing stiffer ER fluid and higher abrasion rate at some raised regions 28. The embodiment shown in FIG. 5a can be modified slightly, as shown in FIG. 5b, to provide a different type of electrical field configuration. If contacts 60 are designed to protrude only slightly or not at all from the surface of polishing pad 50, so as not to come into physical contact with metal layer 22, the electric field lines 65' will be configured as shown in FIG. 5b, with a high field region 67 extending into the region between contact 60 and metal layer 22. Accordingly, the ER fluid in region 67 will stiffen. Raised metal regions 28 pass through this stiffened fluid region and are abraded more aggressively than lower metal regions 34 which do not encounter the stiffened ER fluid. Once all the high points on metal layer 22 have been removed, the polish rate will be even across the metal layer. As soon as any part of the metal layer 22 physically contacts contact 60 and thus causes entire metal layer 22 to be at voltage  $V$ , the electric field in the ER fluid in region 67, and therefore the stiffness of the ER fluid, will be significantly reduced because the effective electrode size will be significantly increased. It is well known that the electric field near a sharp edge electrode is much greater than near an electrode with a large surface area. An aspect of this embodiment, which may be advantageous or disadvantageous according to the particular application, is that the stiffened region 67 of the ER fluid is stationary near

contacts 60, and is not subject to frequency dependent effects as described hereinafter. Applied voltage V may be either DC, yielding a constant stiffened ER fluid region 67, or AC, wherein the stiffened region 67 would occur periodically (Col. 5, lines 5-56).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kaanta et al. ('895), as applied to claims 1, 2, 5, 8, and 9 above, in view of Uzoh et al. (5,807,165).

Kaanta et al. ('895) discloses the claimed invention except for providing a metal mesh in the polishing pad. Uzoh et al. ('165) discloses a polishing article having at least a partially conductive surface and teaches in one embodiment that the pad may be segmented. FIGS. 11b, 11b.1, and 11b.2 show removable cathodes (e.g., copper mesh) disposed within channels formed within the pad 64. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the conductive elements of the pad of Kaanta et al. ('895) by substituting a metal mesh for the electrodes of Kaanta et al. ('895), as clearly suggested by Uzoh et al. ('165).

***Allowable Subject Matter***

6. Claims 3, 6, 7, 10-12, 16-21, 23-27, and 41 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. Claims 29-40 are allowed.
8. The following is a statement of reasons for the indication of allowable subject matter: In a polishing article for polishing a substrate having a body with a polishing surface; at least one conductive element embedded in the polishing surface; and one of more pockets formed in the polishing surface, wherein the conductive element is disposed in at least one of the pockets, it is the examiner's opinion that the pockets formed in the polishing surface for receiving the at least one conductive element has neither been anticipated nor fairly suggested by the prior art of record.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David B. Thomas whose telephone number is (703) 308-4250. The examiner can normally be reached on 8:00-6:30 M-TH.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph J. Hail can be reached on (703) 308-2687. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9302 for regular communications and (703) 872-9303 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1148.

DBT

dbt  
December 10, 2002



Joseph J. Hail, III  
Supervisory Patent Examiner  
Technology Center 3700